TOBACCO INDUSTRY RESEARCH COMMITTEE

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CONFIDENTIAL

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"Arsenic Content of Soils and Absorption by the Tobacco Plant."

Field experiments in which seven rates of arsenic were applied to three different soil types in 1957 were continued on the same sites in 1958 with no further application of arsenic. These experiments were designed to obtain data on the absorption of residual arsenic from the soil and on the distribution of arsenic in the soil. A phosphorus variable was included in 1958 on all treatments and at all locations to study the influence of phosphorus on arsenic absorption.

In the 1958 experiments, the sampling procedures were similar to those employed in 1957. Soil samples were obtained at three depths in all treatments and locations and samples of cured tobacco obtained from all plots.

An extensive sampling of farmer-grown tobacco and fields of known management and cropping history was conducted.

Investigations were continued on methods for the analyses of soils and plants for arsenic. A method for plant analysis has been developed which gives good apparent recovery of arsenic, excellent reproducibility and is adaptable to routine analyses. This method has been employed in the analysis of certain of the samples obtained in 1957. Results of these analyses are given in Table 1.

While the analyses of plant samples from the 1958 experiments and survey have not been completed, the data available at this time show a close similarity to those from the 1957 experiments. The data do not suggest any direct effect of phosphorus on the absorption of arsenic.

Analyses of samples of farmer-grown tobacco on which no arsenical insecticides were applied show that the level of arsenic in the leaf is similar to that found in experiments where no arsenic was applied to the soil.

Since a satisfactory procedure for analysis of soils for arsenic is not yet available, no data are yet available on the arsenic distribution in soils. It is anticipated that the procedure now being developed will be completed shortly and that analysis of the soil samples will commence within three months.

Numerous samples of commercial cigarettes and cigarette tobaccos have been analyzed for arsenic for both college and industry representatives. The enclosed paper was prepared from data obtained largely by procedures developed under TIRC Grant 152 and by personnel working under this grant. This paper is being made a part of this report.

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Table 1. Arsenic content of cured tobacco from three field experiments in which variable rates of arsenic were applied to the soil. 1957

Arsenic applied to soil[1/] lb. As_2O_3/A	Arsenic in leaf, ppm As_2O_3		
	Whiteville[2/]	Clayton[3/]	Rural Hall[4/]
0	1.9	1.4	0.8
2	3.3	2.3	1.5
4	3.5	3.1	1.4
8	4.2	4.5	1.1
16	7.4	8.5	0.9
32	7.3	11.4	1.9
64	9.6	7.8	3.3

1/ When arsenicals were used as insecticides, the rate was equivalent to approximately 2 lb. As_2O_3 per acre per year.
2/ Soil type: Goldsboro fine sandy loam
3/ Soil type: Norfolk sandy loam
4/ Soil type: Cecil sandy clay loam

- xxx -

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